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TA-53 Facility Management

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TA-53 Procedure

Control of Radioactive Waste

53 FMP 105-01.1

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1.0 Introduction

TA-53 (LANSCE) is a multi-use, multi-tenant accelerator facility, located approximately one mile from East Jemez Road. Work involving either radiological material or radiation producing devices is done in a majority of the buildings at the facility. The primary hazard from a radiological standpoint is the prompt and residual radiation levels produced by the 800 MeV accelerator, which is located in building MPF-3 and which provides beam to experimental areas at the Manuel Lujan Jr. Neutron Scattering Center (MLNSC), the Weapons Neutron Research (WNR) facility, Area A, and Area C. Activities that involve other types of radioactive material or radiation producing devices include; Injector testing in building 18, radioactive material analysis in D wing of building 1, klystron testing and repair in building 2, target or sample changes in experimental areas, and maintenance work on various beam lines throughout the facility.

Radionuclides encountered at TA-53 include activation and spallation products that cover most of the periodic table. Volume contaminated items include equipment and materials from the accelerator, beam transport lines, and target areas. The level of activation varies from the lower limits of detection to thousands of rem per hour. Radioactive contamination occurs in a few well-defined areas that include target and beam stop areas, some cooling water systems, parts of the ES-2 and ES-3 exhaust systems, and the isotope production facility. Some waste materials, such as used anti-Cs, are byproducts of maintenance work. Individual items may carry a typical radionuclide "signature" depending on parent materials and radiological conditions present in various areas of the accelerator complex. In addition, a wide variety of sample materials are used in experiments and can become activated.

Los Alamos National Laboratory and the Department of Energy policies require that control of radioactive waste be maintained, waste generation be minimized, and the radioactivity of and exposures from waste be kept as low as reasonably achievable (ALARA). LS 105-05 outlines the requirements for management of radioactive and potentially radioactive wastes in Radiologically Controlled Areas (RCAs). It allows for the segregation of radioactive and non-radioactive waste based on either Acceptable Knowledge and/or measurements and analysis. This procedure has been developed to specify how radioactive and non-radioactive waste from RCAs will be managed at TA-53.

2.0 Purpose

This procedure formalizes the handling and management of radioactive and non-radioactive waste from RCAs at TA-53. The objective of this procedure is to ensure that all waste from RCAs are properly segregated as radioactive and non-radioactive and disposed of properly.

3.0 Scope

This procedure applies to the management of all waste generated within RCAs at TA-53.

Note: Disposition of the radioactive water from accelerator cooling systems which is drained to holding tanks and ultimately to the TA-53 surface impoundment is not within the scope of this procedure.

4.0 Definitions

Acceptable Knowledge (AK) — Includes process knowledge, supplemental waste analysis data, and facility records or analysis as applied to waste characterization.

Activation — The process of inducing radioactivity by irradiation, for example by particle beams.

Appropriate Release Criteria (ARC) — Those radiological criteria accepted by the Laboratory as appropriate and used to release equipment, material, and waste from RCAs and/or radiological areas. Appropriate release criteria are developed in accordance with or adopted from relevant laws, DOE orders, and standards (such as 10 CFR 834 [when promulgated], 10 CFR 20, DOE Order 5400.5 [as revised], etc.), and are approved by the DOE as necessary. ARC are defined for both surface contamination and volume contamination, specific to the media and radionuclides.

Non-radioactive waste — Waste that meets the appropriate release criteria for both surface and volume contamination. Non-radioactive waste can be released to an appropriate facility that is not licensed to accept radioactive material, such as a sanitary or hazardous waste landfill.

Radioactive waste — Solid, liquid, or containerized gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and is of negligible economic value, considering costs of recovery. Radioactive waste has radioactive surface contamination or radioactive volume contamination in excess of the appropriate release criteria, as defined in this document.

Radiological Controlled Area (RCA) — An area to which access is managed to protect individuals from exposure to radiation or radioactive materials. In an RCA controlled for contamination, a reasonable potential exists for contamination to occur at levels in excess of those specified in DOE order 5400.5, Table 1, or a reasonable potential exists for an individual to receive more than 0.1 rem committed effective dose equivalent (CEDE) during a year from intakes. In a RCA controlled for volume contamination, a reasonable potential exists for the presence of volume contaminated materials that are not individually labeled. In an RCA controlled for external radiation, a reasonable potential exists for an individual to receive more than 0.1 rem during a year from external radiation fields. At TA-53, RCAs controlled for external radiation only do not contain the potential for volume activation unless there is a very high radiation area within. Therefore, the "controlled for volume contamination" and "controlled for contamination" postings constitute the control boundaries for waste removal activities addressed by this procedure.

NOTE: "Controlled for volume contamination" postings were still being installed as of the date of this procedure. In areas where this posting has not yet been put up, the former "RMMA" postings shall serve as the boundary.

Segregate — To separate wastes into radioactive and non radioactive waste streams.

Surface contamination — Radioactive contamination present on the surface of equipment in excess of the appropriate release criteria.

Volume contamination — Radioactive contamination dispersed throughout a matrix in excess of the appropriate release criteria. Examples of volume contamination are contaminated liquids and soils, materials activated by irradiation (for example, by particle beams), and smelted metals (where the smelting process incorporates radioactive material into the matrix of the metal).

Waste generator — Any individual and his or her line management having direct responsibility for operations that generate waste (for example, a research scientist or project manager). Waste generators have responsibility for the characterization, storage, and disposal of the waste they generate.

Waste Management Coordinator (WMC) — the individual responsible for coordinating waste management activities on behalf of waste generators, line managers, facility managers, the waste management groups, and other Laboratory organizations. This individual also coordinates resolution of waste management issues on behalf of his or her waste generating organizations, and reviews documents pertaining to the management of waste.

5.0 Responsibilities

If you are a	**Then you must**
waste generator at TA-53	· follow the requirements stated in this procedure.
supervisor	· ensure that personnel under your supervision comply with requirements of this procedure and have been properly trained on those requirements.
Facility Manager	· provide oversight for the implementation and use of this procedure.
Waste Management Coordinator	· facilitate and coordinate waste management activities within the facility. · ensure that the requirements of this procedure and those of LS 105-05 are met. · establish and maintain an acceptable Knowledge (AK) file for each radioactive waste stream to which AK is applied. · suspend waste generating operations in an RCA, when necessary to comply with the requirements of this procedure (authority of the Facility Manager may be required). · maintain procedures for random sampling and records of the results of sampling · conduct investigations to identify causes for noncompliances discovered through sampling.
ESH-1 RCT	· perform surveys in accordance with the appropriate ESH-1 procedures and this procedure.

6.0 Precautions And Limitations

Failure to follow the requirements of this procedure could result in:

6.1 Loss of control of radioactive waste, causing unnecessary exposure or contamination of LANL employees, members of the public, and /or the environment, which could cause the shutdown or suspension of work activities for the entire facility.

6.2 Only individuals who have received documented training on this procedure may use AK to segregate radioactive from non-radioactive waste at TA-53.

NOTE: It is incumbent on each waste generator at this facility to minimize radioactive waste to the maximum extent consistent with programmatic objectives.

7.0 Procedure

All radiological surveys and sample analysis required by this procedure will be performed in accordance with the appropriate established Laboratory and ESH procedures, and can be performed only by personnel trained in the appropriate survey and analytical methods. RCTs perform surveys, and personnel authorized by ESH-4 or ESH-1 to operate HPAL or TA-53 count lab instruments carry out analytical work. The requirements of the current ESH-1 Quality Assurance Plan shall be complied with. For assistance with the requirements of this procedure, contact the TA-53 RCT office (7-7069) or the TA-53 Waste Management Coordinator (7-6995).

7.1 Facility-wide Waste Management

7.1.1 When survey data are not the sole source of information used to determine that an item meets the Appropriate Release Criteria (ARC), the decision that the available information is sufficient must be made by a person that is familiar with the historical and current activities in the area, as well as with the history of the item, and with the policies and procedures in place for managing waste. This process will enable the Waste Coordinator to dispose of the item with a high degree of confidence that no procedural requirements have been violated.

7.1.2 To enable personnel to use AK consistently and reliably, formal documentation and records are to be used to define the boundaries of normal operating conditions. Any combination of the following will be used for this purpose:

- authorization basis documentation;
- operating records;
- radiological survey procedures and records;
- other appropriate records that indicate the history of an item

These documents provide a basis for the WMC's determination of actions to be taken when the boundaries have been breached, and to document the adequacy of the AK which is used to declare that an item is non-radioactive. These documents (including this procedure) shall be considered a part of the AK files that are maintained for the radioactive waste streams at TA-53. Other forms of AK documentation may be used, provided that they are specifically relevant to the waste being generated or the persons generating that waste; examples are laboratory notebooks, radioactive material shipping and receiving records, waste characterization records, waste shipping records, process descriptions, and personnel training records. It is the responsibility of line management and the person assigned to maintain the AK file to determine which, if any, additional documents will be required as part of the AK file for any specified RCA.

NOTE: The AK file may be a collection of relevant documents, or an itemized list of the locations and custodians of relevant documents, or a combination of both. AK files will be maintained by the lead TA-53 Waste Management Coordinator in AOT-FM.

7.2 Waste Segregation

NOTE: As of the date of this procedure, the "Green is Clean" program was being evaluated for implementation at TA-53. This procedure will be updated when the program is fully evaluated.

7.2.1 Waste may be segregated based on whether it is known to meet ARC. If segregation is not applied, waste will be considered radioactive and sent to TA-54 for disposal. If waste is segregated, green waste containers shall be used within RCAs to dispose of waste which meets ARC, and yellow containers shall be used to dispose of waste which does not or may not meet ARC.

7.2.2 An item may be treated as non-radioactive without a direct or smear survey, if all of the following conditions are met:

- No spills or airborne releases have taken place since the most recent radiological survey.
- The item has not been in direct contact with other items or areas with radioactive surface contamination.
- The item has not been exposed to a direct or scattered particle beam within a very high radiation area.
- The item's use and location indicate that it has not been or expected to be contaminated or activated.
- The item is not tagged or labeled as radioactive or potentially radioactive.
- The item was not connected to a contaminated system. (The vacuum envelope of accelerator and beam transport lines is normally assumed to be internally contaminated unless determined otherwise by ESH-1.)

- There are no other reasons to expect that the item is contaminated or activated.
- The person disposing of the item has enough knowledge of the use and history of the item to accurately determine that all of the previous requirements are met.

7.2.3 An item may be discarded as non-radioactive waste based upon a combination of AK and survey results, or based only on survey results, if all conditions listed below are met:

- The item is surveyed for loose and fixed surface contamination in accordance with LP 107-04.1, "Releasing Material and Equipment."
- The appropriate instrument for the type of radiation and detection limit is used.
- Survey results for all accessible surfaces indicate that the ARC have been met.
- Interior surfaces or volumes are determined to be free of contamination based on AK.

In cases where the potential contamination is not specifically identified by radionuclide, the most stringent release criteria shall be applied. **Surface contamination surveys shall not be used to show the absence of volume contamination.**

NOTE: The conditions stated above include items to be released from contamination, high contamination, airborne, and radioactive material areas (including hoods). Because of the external background radiation levels in some TA-53 RCAs, items may be moved to a lower background area to verify that the ARC are met.

7.3 Radioactive Waste.

Waste that does not meet the criteria in the two previous sections above shall be treated as radioactive and shall be placed in appropriately designated containers.

7.4 Control of Green Containers in RCAs.

Waste Management Coordinators or RCTs may remove any waste container from service for any condition which might compromise the objectives of this procedure. Waste containers in RCAs that have been removed from service shall be clearly labeled or posted to indicate their status. The label or sign shall be placed on the container in such a way that the container cannot be opened without physically moving the label. Factors such as the radiological conditions in the RCA and the status of the waste shall be evaluated by the waste management coordinator (or designee) prior to placing out-of-service containers back into service. Placing a waste container out-of-service and returning it to service shall be documented, and the documentation shall be considered AK documentation.

7.5 Random Sampling Program for Green Containers.

When segregation is employed, the Waste Management Coordinator shall establish a random sampling schedule for contents of green containers based on:

- Type of waste stream
- Volume of waste
- Degree of confidence in AK

Survey and analytical methods appropriate to determining the acceptability of an item for free release shall be used (ref. LP 107-04). The WMC shall maintain sampling procedures and documented results of the sampling. Radiological survey results are maintained by the TA-53 ESH-1 office.

If an item does not meet the criteria for release, the following actions shall be taken:

- the item shall be tagged with the survey/analytical information and placed in an appropriate area for storage of radioactive materials;
- access to the item shall be controlled and limited to personnel designated by the WMC or Facility Manager, pending results of an investigation by the WMC;
- the WMC shall notify the Facility Manager, who shall determine if a reportable occurrence exists;
- the WMC (with ESH-7, if appropriate) shall conduct an investigation to determine why the item is noncompliant and if any other items with a similar history warrant survey/analysis or disposition as radioactive;
- release of other items from the same lot or with a similar history shall be suspended pending the results of the investigation, unless survey/analytical results indicate acceptability for release.

8.0 Required Records

Acceptable Knowledge Files
Radiological Survey Results
Green Container Random Sample Procedures
Green Container Random Sample Results
Investigation Reports

9.0 References

LS 105-05.0, “Removing Waste from Radiological Controlled Areas”
LP 107-04.1, “Releasing Materials and Equipment”
ESH-1-01-11, “ESH-1 Quality Assurance Program Plan”